River gorge eradication by downstream sweep erosion

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Supplementary figure 1
Supplementary figure 2
Supplementary figure 1:

Photographs showing the retreat of the upstream boundary. Photographs have been rectified so that each shows exactly the same view at the same scale. For each image, the red and black lines show the previous and current location of the boundary, respectively.

Supplementary figure 2:

Possible examples of downstream sweep erosion from a range of settings.

A) An epigenetic bedrock gorge on a tributary to the Lancang River, eastern Tibet. Only a very thin ridge remains between the broad channel upstream of the gorge and the main river, and the morphology of this ridge (near vertical on the upstream side and sloping on the downstream side) suggests that it is being eroded from upstream.

B) An anticline in the Kashgar region of Xinjiang Province, China that is being eroded from upstream by the Ushmurvan River. This region contains a number of anticlines that have flat beveled tops, suggesting intermittent periods of rapid downstream sweep erosion.

C) A landslide on the Kali Gandaki River that is being eroded from upstream. Because the gorge is still incising, with an abrupt knickpoint at the gorge entrance, sediment is still ponded in the channel upstream. We observed signs of active erosion, such as undercut banks, on the upstream boundary.

D) An apparent downstream propagating braidplain on the Rakaia River, New Zealand. Several of the rivers draining into the Canterbury Plain have similar features.

E) Erosion into rock/debris avalanche deposits on the Kali Gandaki River at Jomsom. The river is currently incised into the terrace with a channel of uniform width. The former valley width is consistent with the width of the braidplain upstream.